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Farg‘ona davlat universiteti “Matematik analiz va differensial tenglamalar” kafedrasi, dotsent, fizika-matematika fanlari nomzodi Abdurasul Rafikov taqrizi ostida

TEXNIK UNIVERSITET TALABALARIGA OLIY MATEMATIKANI O‘QITISHDA MAPLE KOMPYUTER TIZIMIDAN FOYDALANNISH IMKONIYATLARI

Annotatsiya. Maqolada Maple tezimidan foydalanib texnika universitetlar talabalariga oliy matematika fanini o‘qitish masalasi ko‘rilgan. Unda fazoda analitik geometriyadagi piramida va sferaning o‘zaro joylashuvi masalasini yechish Maple dasturi asosida bajarilgan.

Kalit so‘zlar. Maple, kompyuter, modellashtirish, grafik, displey, textplot3d, sfera

ВОЗМОЖНОСТИ ИСПОЛЬЗОВАНИЯ КОМПЬЮТЕРНОЙ СИСТЕМЫ MAPLE В ПРЕПОДАВАНИИ ВЫСШЕЙ МАТЕМАТИКИ СТУДЕНТАМ ТЕХНИЧЕСКИХ УНИВЕРСИТЕТОВ

Аннотация. В статье рассматривается вопрос преподавания высшей математики студентам технических вузов с использованием программы Maple. В ней решается задача аналитической геометрии о взаимном расположении пирамиды и сферы в пространстве с помощью программы Maple.

Ключевые слова: Maple, компьютер, моделирование, графика, дисплей, textplot3d, сфера.

POSSIBILITIES OF USING THE MAPLE COMPUTER SYSTEM IN TEACHING HIGHER MATHEMATICS TO STUDENTS OF TECHNICAL UNIVERSITIES

Abstract. This article examines the use of Maple in teaching higher mathematics to students at technical universities. It solves an analytical geometry problem about the spatial relationship between a pyramid and a sphere using Maple.

Keywords. Maple, computer, modeling, graphics, display, textplot3d, sphere.

Kirish. Maple tizimning matematik funksionalligi dasturiy ta’minot imkoniyatlarini kengaytirish va undan foydalanish mavzularni o‘zlashtirish samaradorligini oshirish imkonini beradi. Hozirgi kunda Maple kompyuter tizimidan foydalangan holda oliy matematikani o‘qitiladigan texnik universitetda o‘quv jarayonida katta samarali natijalar bermoqda. Bunga Maple dashturi yordamida yechilish aniq va sifatli ekanligini fazoda piramida va sferaning joylasuvi masalasini yechishda ko‘rsatamiz[1,2].

M a p l e d a s t u r i

```
> restart; with(plots):with(plottools):

> _EnvXName := x: _EnvYName := y: _EnvZName := z:
```

Piramida uchlarining koordinatalari:

```
> x1:=-7: y1:=-12: z1:=2: x2:=12: y2:=7: z2:=17:

x3:=4: y3:=6: z3:=-10: x4:=-12:y4:=18: z4:=7:

> TochA1234:=textplot3d([[x1+0.02,y1,z1,"A1"], [x2+0.02,y2, z2, "A2"],[x3+0.02,y3,z3,"A3"], [x4+0.02,y4,z4,"A4"]], font=[TIMES,ROMAN,20],

align=RIGHT, color=black);
```

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TochA1234 := PLOT3D(...)

Piramida qirralarini qurish:

> BUTP:=display(line([x1,y1,z1],[x2,y2,z2]), line([x1,y1,z1],[x3,y3,z3]),line([x1,y1,z1], [x4,y4,z4]),line([x2,y2,z2],[x3,y3,z3]), line([x2,y2,z2],[x4,y4,z4]),line([x3,y3,z3],

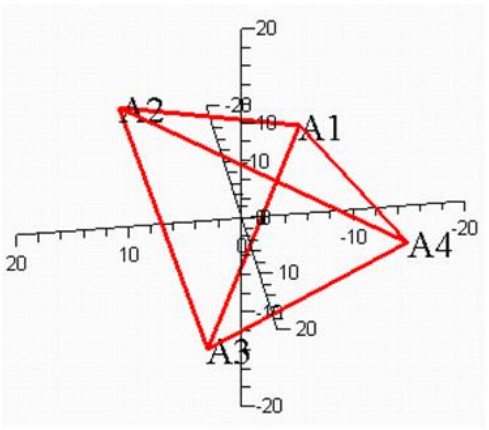
[x4,y4,z4]), color=red, linestyle=solid,thickness=2);

BUTP := PLOT3D(...)

Piramidani qurish(1-rasm):

> plots[display]({BUTP,TochA1234},axes=normal, thickness=1, orientation=[81,59],view=[-20..20,

-20..20,-20..20]);



1-rasm.

Fazoda bir tekislikda yotmagan 5 ta nuqradan o'tuvchi piramida tenglamasini aniqlash va qurish(2-rasm):

> with(geom3d):

> point(A1,x1,y1,z1),point(A2,x2,y2,z2), point(A3,x3,y3,z3),point(A4,x4,y4,z4):

> triangle(T1,[point(A1,x1,y1,z1),point(A2,x2,y2,z2), point(A3,x3,y3,z3)]);

T1

> sphere(s,[A1,A2,A3,A4],[x,y,z]); Sf:=Equation(s); *s*

$$Sf := -\frac{732924}{2989} + x^2 + y^2 + z^2 + \frac{9417}{2989}x - \frac{23907}{2989}y - \frac{5491}{427}z = 0$$

> ABC:=draw([T1],style=patch);

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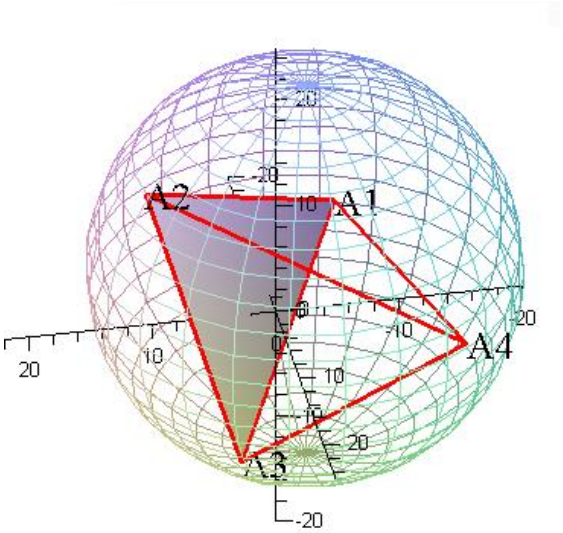
ABC := PLOT3D(...)

> Sfer:=draw([s],style=wireframe);

Sfer := PLOT3D(...)

> plots[display]({BUTP,TochA1234,ABC,Sfer},axes=normal, thickness=1,orientation=[81,59],view=[-20..25,-20..25,

-20..25]);



2-rasm.

Natijalar. Maqolada tasvirlangan yondashuvlarni amalga oshirish misoli shuni ko‘rsatdiki, Maple kompyuter tizimining turli komponentlaridan foydalanish ushbu tizimdan ta'lim dasturlari doirasida o‘quv jarayonini takomillashtirish va sanoat va texnik xarakterdagi amaliy muammolarni hal qilish uchun foydalanish imkoniyatlariga qiziqqan tajribali o‘qituvchilarning e’tiborini tortadi. Bu matematika ta'limi samaradorligini oshirish uchun turli profillardagi texnik universitetlarda Maple kompyuter dasturidan foydalanishning oqilona va maqsadga muvofiqligini ko‘rsatadi.

Xulosa. Tadqiqot bizga muhandislik va texnik universitetlar talabalariga oliy matematika o‘quv dasturining asosiy mavzulari va bo‘limlarini o‘qitish uchun Mapledan foydalanishning optimal usullarini ishlab chiqish imkonini berdi. Maple tizimida modellashtirishdan foydalanish bo‘lg‘usi muhandis talabalarini bilim olis sifati va samaradorligiga ijobiy ta’sir ko‘rsatdi. Bugungi kunda kompyuter yordamida ko‘plab masalalarni, matematik modulini tuzishda va bu masalalarni katta tezlikda hal qilishga xizmat qiluvchi Maple matematik paketi mavjud bo‘lib, murakkab geometri shaki va grafiklarni 2D va 3D farmatlarida tez, aniq va sifatli tasvirlashda Maple tizimi dasturlaridan foydalanish qulay va samarali ekanligi ko‘ramiz[[6,7].

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Muallif haqida ma’lumot.

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